

Tracts 957.

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complements





WEST LONDON POST-GRADUATE LECTURES.

III.—REMARKS ON GLAUCOMA.

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PERHAPS nothing, save Listerism, illustrates so well the advance of scientific surgery during the past half century, as the discovery by Graafe of iridectomy for the relief of glaucoma. In the pre-iridectomy days the armamentarium relied on by the old surgeons in the treatment of this disease consisted of purges, antiphlogistics, diaphoretics, diuretics, laxatives, and a mercurial course pushed to the extent of salivation. When, therefore, Graafe turned his attention to the subject the disease was regarded as incurable. The first step in his inquiry was to try atropine—the ban of ophthalmic surgeons now-a-days in cases of glaucoma. It is recorded, however, that the results were unsatisfactory, which is not surprising, but the failure of the drug to effect good was attributed by Graafe to the fact that owing to the increased tension of the eye the atropine was not absorbed. Then he tried paracentesis of the anterior chamber, but only temporary relief attended this procedure. However, Graafe had satisfied himself that the loss of vision associated with glaucoma was due to increased intraocular tension causing compression of the optic

nerve and retina, consequently the problem confronting him was, how to reduce this increased tension. The method by which he arrived at the solution thereof is especially worthy of notice. Graafe was no dabbler in science. His conception of the treatment of glaucoma by iridectomy was the deliberate outcome of a process of didactic reasoning and experimental investigation. His observations had made him acquainted with the effects of an artificial pupil in certain cases of partial staphyloma of the sclerotic and cornea. He found that the staphyloma would become less prominent if he made an artificial pupil. He also satisfied himself by performing iridectomy upon animals that the eyes operated on were reduced to a low degree of tension. Fortified, then, with these data, he arrived at the conclusion that an iridectomy would relieve the tension of a glaucomatous eye. Such, then, in brief, is the history of the discovery of one of the most beneficent operations which has ever been introduced for the relief of human suffering.

The *fons et origo* of glaucoma is increased intraocular tension, due to some change or changes in an eye by which disturbance of the balance of secretion and outflow of the intraocular fluid has ensued. The fluid in question is secreted from the ciliary body; it passes backwards to make up deficiencies in the vitreous body, and it passes forwards through the pupil into the anterior chamber to supply the aqueous; and any excess of these requirements escapes by filtering through the ligamentum pectinatum into Schlemm's canal and the veins in connection therewith. The point at which the fluid thus escapes is called the angle of the anterior chamber, or the filtration angle, and as long as the integrity of this angle is maintained, the secretion of the intraocular fluid among other things accomplishes the purpose of preserving the normal tension of the eye. But should anything interfere with the escape of the fluid, in other words, should the filtration angle become blocked, the fluid is retained in the eye, and when this occurs the intraocular tension begins at once to rise. These facts have been proved experimentally, clinically and pathologically, and thus the pathogenesis of glaucoma, which a few years ago was still regarded as doubtful, is now admitted to be demonstrably certain.

In common with many other diseases the onset of glaucoma is most generally associated with definite premonitory signs. I desire to call particular attention to this point, inasmuch as I believe that it is owing to the failure of patients to seek skilled advice at this period of the disease that much of its evil effects are due. Prevention is always better than cure, and it is undeniably true that in many cases the advance of early glaucomatous symptoms can be kept in check by timely

treatment. Perhaps the earliest premonitory sign of glaucoma is the increasing failure of accommodative power, by which a middle-aged patient becomes conscious of a rapidly advancing presbyopia and is compelled at short intervals to seek optical aid in the form of stronger convex glasses.

But this is not the chief source of complaint. Generally it happens that the patient complains of seeing "haloes" or coloured rings from time to time around the gas lamps in the streets, and of occasional attacks of loss of vision during the daytime. These symptoms point to sudden, though transitory, onsets of increased tension, any one of which is liable to persist and result in the development of an acute attack of glaucoma. From all this it is possible to conceive the importance of the early recognition of the premonitory symptoms of the disease. Whenever a patient from whom such symptoms can be elicited comes for advice, the chances are greatly in favour of the ophthalmic surgeon being able to check the progress of the disease by special treatment. I am here mainly referring to cases of primary glaucoma, such, for example, as those in which the disease is not secondary to pathological changes which have previously taken place in the eye.

Whatever may be the primary cause of glaucoma, one of its most marked features is the multiplicity of the symptoms with which it is associated. These may be described under two heads, namely, extraocular and intraocular. With regard to the first, in an acute case there is deep ciliary and conjunctival injection of the globe; in bad cases there may be even chemosis of the conjunctiva. Next there is "steaminess" of the cornea, due to œdema of its epithelial layer; moreover there is more or less anæsthesia of the cornea. Then intraocularly we find a shallow anterior chamber caused by the pressure forward of the lens, a dilated and immovable pupil, this depending upon paralysis of the constrictor fibres of the iris arising from the compression of the ciliary nerves. Again, cupping of the disc is present, due to the yielding of the sclerotic at the entrance of the optic nerve. In addition to these symptoms there is pain in the eye, often very acute, and radiating around the orbit, the organ is very tender upon palpation, and vision may be reduced to counting fingers at a few inches from the eye, or in bad cases there may be merely perception of light. Again, there is contraction of the field of vision; this is first noticeable upon the nasal side of the fundus, and is due to anæmia of the retinal vessels, caused by their compression by the high state of intraocular tension. Thus the manifold symptoms to which glaucoma gives rise clearly emphasise the importance of its early recognition, and the urgency which exists for the speedy interfer-

ence of the surgeon, for the longer that the disease is allowed to remain unrelieved, the more destructive do its effects become upon the various ocular tissues.

The fact that rapidly advancing presbyopia is a premonitory symptom of glaucoma is one that should never be lost sight of, for depending upon it is a rule in ophthalmic practice, the observance of which is not only highly expedient in the interests of the surgeon, but very necessary in those of the patient. The rule to which I allude is that of being careful to avoid the indiscriminate use of a mydriatic in persons over 40 years of age. Unfortunately, experience has shown that much harm may be caused by the neglect of this precept. Cases have been recorded in which a single instillation of homatropine used for the purpose of dilating the pupil in order to make an ophthalmoscopic examination has been followed by a virulent attack of glaucoma, demanding an immediate iridectomy for the relief of the symptoms. Although it is true that a catastrophe of this nature has only rarely occurred, nevertheless it is wise to be always on our guard against it. It is more than likely, however, in those cases in which sudden glaucomatous symptoms have followed the inadvertent dilatation of the pupil by a mydriatic, that the affected eye was already the seat of changes predisposing to the disease. However, the moral is that whenever any suspicion may exist that an artificially dilated pupil in an elderly person may thus lead to harmful results, the surgeon should never lose sight of the patient until he has secured myosis by means of the instillation of eserine. It is easy to comprehend the reason which causes atropine or any other mydriatic to be so harmful in cases of glaucoma. Mydriatics, by giving rise to a maximum dilatation of the pupil, result in crowding the iris into the angle of the anterior chamber and in consequence of this the outflow of the intraocular fluid is still further prevented.

Anything which tends to produce congestion of the uveal tract is prone to give rise to primary glaucoma in persons predisposed thereto. According to Priestley Smith, "the common antecedents of glaucomatous attacks are exposure to cold and damp, fatigue, hunger, loss of sleep, depressing emotion, constipation, hepatic derangement, heart-weakness, bronchitis, in short, various conditions which disturb the circulation and congest the venous system."¹ Perhaps the commonest history obtainable from glaucomatous patients is one of domestic worry, brought about by financial loss. The sufferers are most frequently women of middle age, upon

¹ "System of Diseases of the Eye," edited by Norris and Oliver, vol. iii., page 648.

whose features misfortune is depicted, who are nervous, desponding, often querulous, and who apparently cannot avoid mischievously brooding over the fate which has befallen them.

But while predisposition, the increase in the size of the lens with the advance of years, and the occurrence of changes which tend to suddenly augment the vascularity of an eye may be enumerated, somewhat indefinitely, as the causes of primary glaucoma, on the other hand, the causes of secondary glaucoma are plain and determinable. A variety of pathological conditions within the eye may bring about a rise in the intraocular tension, and thus precipitate a glaucomatous attack. Mention may first be made of the disturbance of the normal relations of the iris to the structures in contact with it; for example, such as total posterior synechiæ and anterior synechiæ associated with perforating wounds or ulcers of the cornea. Again, acute glaucomatous symptoms are usually associated with intraocular growths of the choroid or retina, where the neoplasms have advanced beyond a certain stage. Again, dislocation of the lens, either into the anterior chamber or the vitreous, may interfere with the outflow of fluid from the eye, and thus give rise to increased intraocular tension. Moreover, mention may be made of the glaucomatous symptoms which sometimes occur in connection with attacks of iritis and irido-cyclitis.

In discussing the all-important question of the treatment of glaucoma, the first point to consider is—What should be done with a patient in whom some of the premonitory signs of the disease have appeared? Undoubtedly these are the cases in which much benefit can be derived from the use of eserine. Some drops of a solution of this alkaloid of the strength of half a grain to an ounce of water should be instilled into the conjunctival sac twice daily, and the effect of this will be to cause a firm contraction of the pupil, the cessation of the signs of temporary increased tension, such as "haloes" and occasional obscuration of the vision, and the diminution of the risk of the sudden development of an acute attack of the disease. The drops should be continued for some weeks, during which time the patient should be kept under observation.

In cases of acute glaucoma the performance of an immediate iridectomy still remains the best method of treatment. Some effort has of late been made to introduce an alternative procedure, namely, that of the removal of the superior cervical ganglion, and cases have been recorded in which some success has followed therefrom. But, despite the results which have been claimed for the operation, there is little likelihood that it will ever supplant iridectomy

in the treatment of these cases. So far as the arrest of the slowly progressive changes associated with the presence of chronic or simple glaucoma are concerned, experience has taught that treatment is often unavailing. The continuous instillation of eserine of the strength above mentioned should first be resorted to, and if, subsequently, it becomes perfectly evident that the disease is still making progress, then an iridectomy should be performed. Sometimes the operation may seem to do harm by being followed by a further reduction in the vision, and this is probably due to the additional worry and anxiety to which the prospect of undergoing the ordeal is apt to give rise. Still, until an iridectomy has been performed, it is not possible to say that every chance of relief has been afforded the patient. In some cases, according to Allard, the application of the galvanic current is useful. The positive pole is applied along the course of the cervical sympathetic, and the effect of the current is said to be that of diminishing the excitability of the sympathetic branches. As patients with glaucoma are often depressed, nervous, and out of health, a nerve stimulant containing small doses of arsenic and strychnine is indicated, and they should be persuaded, if possible, to put away from them that mental disturbance and worry upon which the onset of their symptoms has so largely depended.

